

University of Groningen

Expectations from Different Perspectives on Future Work Outcome of Young Adults with Intellectual and Developmental Disabilities

Holwerda, Anja; Brouwer, Sandra; de Boer, Michiel R.; Groothoff, Johan W.; van der Klink, Jac J. L.

Published in:
Journal of Occupational Rehabilitation

DOI:
[10.1007/s10926-014-9528-3](https://doi.org/10.1007/s10926-014-9528-3)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Early version, also known as pre-print

Publication date:
2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Holwerda, A., Brouwer, S., de Boer, M. R., Groothoff, J. W., & van der Klink, J. J. L. (2015). Expectations from Different Perspectives on Future Work Outcome of Young Adults with Intellectual and Developmental Disabilities. *Journal of Occupational Rehabilitation*, 25(1), 96-104. <https://doi.org/10.1007/s10926-014-9528-3>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Expectations from Different Perspectives on Future Work Outcome of Young Adults with Intellectual and Developmental Disabilities

Anja Holwerda · Sandra Brouwer ·
Michiel R. de Boer · Johan W. Groothoff ·
Jac J. L. van der Klink

© Springer Science+Business Media New York 2014

Abstract *Purpose* Expectations strongly influence future employment outcomes and social networks seem to mediate employment success of young adults with intellectual and developmental disabilities. The aim of this study is to examine the expectations of young adults with intellectual and developmental disabilities from special needs education, their parents and their school teachers regarding future work and the extent to which these expectations predict work outcome. *Methods* Data on 341 young adults with intellectual or developmental disabilities, coming from special needs education, aged 17–20 years, and with an ability to work according to the Social Security Institute were examined. *Results* The school teacher's expectation was the only perspective that significantly predicted entering competitive employment, with a complementary effect of the expectation of parents and a small additional effect of the expectation of the young adult. *Conclusions* Expectations of school teachers and parents are valuable in predicting work outcome. Therefore, it is important for professionals working with the young adult in the transition from school to work to incorporate the knowledge of school teachers and parents regarding the abilities of the young adult to enter competitive employment as a valuable source of information.

Keywords Young adult · Intellectual disability · Developmental disabilities · Employment

A. Holwerda (✉) · S. Brouwer · J. W. Groothoff ·
J. J. L. van der Klink
University Medical Center Groningen, University of Groningen,
Groningen, The Netherlands
e-mail: a.holwerda01@umcg.nl

M. R. de Boer
Department of Health Sciences, VU University, Amsterdam,
The Netherlands

Introduction

Many young adults with disabilities lag behind in terms of education, employment, and independent living, compared to their peers in the general population [1]. Although being employed is a valued adult role and a primary indicator of success in society [2–4], young adults with disabilities have a hard time finding and maintaining employment [5–7]. Compared to over 80 % of young adults without disabilities [7] and almost 90 % of students with a vocational training background [8], only about 50 % of special needs education students with disabilities were competitively employed within 2 years after leaving school [3, 9, 10]. This percentage of young adults with disabilities in employment slightly increases to 57 % within 4 years after leaving school [11] and to 60 % within 8 years after leaving school [12]. Intellectual and/or developmental disabilities are the most common disorders among students of special needs education in the Netherlands and these disorders often occur simultaneously. The participation rates of young adults with intellectual disabilities range from 10 to 40 % [13–16] and similar rates apply to young adults with developmental disorders: 10–54 % [3, 17–21]. The majority of young adults with intellectual and/or developmental disabilities in the Netherlands are educated in schools for special needs education. These special needs schools provide vocational training and internships for young adults with disabilities in the final years at school and appropriate job placements in the transition from school to work.

Expectations About Future Work Outcome

In the return to work and work disability literature, there is extensive evidence for a positive association between

expectations regarding return to work or work disability outcomes and the future work outcome [22–26]. When individuals expect to return to work they are more likely to do so. In disability claimants an association was found between their expectations and actual improvement in functioning 1 year later [27]. This association between expectations and work outcome may also apply to young adults with intellectual and/or developmental disabilities in their transition from school to work, when entering competitive employment. The majority of transition-age young adults with disabilities, when asked about their future plans, indicate that they want to obtain a paid job [3, 6, 28–31].

Different Perspectives on Employment Outcomes

Several studies have noted the influential role of social networks in mediating the employment success of young adults with disabilities [2, 10, 32–35]. By role modeling and sharing information regarding their own occupations and their expectations for the young adult, family influences the career interests and aspirations of the young adult [35]. Especially parents' expectations for the future of their young adult with disabilities can be a powerful influence on the employment options, experiences and transition outcomes of their young adult after leaving school [2, 3, 29, 36, 37]. This influence can be positive as well as negative. The US National Longitudinal Transition study (NLTS-2) in students from special education reported that 90 % of the parents expected their child to definitely get a paid job and 8 % thought their child would probably get a paid job [3]. Another study found that young adults with disabilities were 2.7 times more likely to be working after secondary school, when their parents expected them to do so [37]. According to the NLTS-2, family members played a supportive role in many aspects of the career development of young adults with disabilities [35]. However, parents may also overestimate the abilities of their young adult and may have a hard time acknowledging that their expectations for their young adult are not realistic [38]. On the other side, parents as well as teachers are said to underestimate the abilities of young adults with disabilities [39], which may hold back the young adult in reaching their full potential.

Besides parents, teachers play a critical role in the transition to employment, by substantially contributing to the educational achievements of students and the preparation of the young adult for the workforce [31, 35, 40–42]. The NLTS-2 found that school staff had a strong influence on the career development of young adults with disabilities [35]. Fall et al. [43] found that teacher support predicted students' self-perceptions, which in turn predicted students' academic engagement and achievement. Other studies also found that perceived teacher support was

related to greater academic achievement [44, 45]. Academic achievement has been associated with positive employment outcomes (e.g. employment stability and higher income) in young adults in regular education [33, 46, 47]. Two NLTS-2 studies in young adults with disabilities showed a small similar effect [2, 3, 48]. Another NLTS-2 study did not find a significant difference in employment outcomes for high school completers and dropouts with disabilities [49].

Currently there is little evidence regarding the value of expectations in predicting work outcome for young adults with intellectual and/or developmental disabilities. Furthermore, the contribution of the different perspectives on work outcome is unclear for this group of young adults that is generally more dependent on parents and school teachers than their peers without disabilities. The expectations of future work outcomes by young adults with special needs education, their parents and school teachers may be a valuable source of information predicting employment outcome.

Therefore, the aim of the present study is to examine the expectations of young adults with intellectual and/or developmental disabilities from special needs education, their parents and their school teachers regarding future work and the predictive value of these expectations on competitive employment.

Methods

Participants and Procedure

This study is part of a cohort study called 'Young Disabled at Work' in which factors that predict work participation among young adults aged 15–27 years applying for a disability benefit at the Dutch Social Security Institute (SSI) were examined. The SSI is responsible for all work-ability assessments under social security regulations. All participants applying for a disability benefit and eligible for the cohort study were recruited using registry data from the local SSI offices in the three northern regions in the Netherlands (Groningen, Friesland, Drenthe). For this study only participants with intellectual and/or developmental disabilities, attending special needs education, aged 17–20 years, and with an ability to work according to the SSI were included. The level of work ability is determined by estimating the claimants' chances to be able to find and retain work independently, earning at least minimum wage level, and by assessing their need for assistance and support to find and maintain work. For a detailed description of the work ability assessment in the Netherlands, see Holwerda et al. [50]. Recruitment started at January 1st 2009 and ended at 31st December 2009. Written consent was

provided by all claimants and the Medical Ethics committee of the University Medical Center Groningen, the Netherlands, approved recruitment, consent and field procedures prior to the study.

Preceding the disability assessment the participants were approached by the SSI to fill out a questionnaire, including their expectations regarding future work and socio-demographic items. If participants had difficulty with the questions because of their limited reading ability, they were allowed to ask for assistance from parents or school teacher. For the present study participants as well as their school teachers and in case participants resided with their parents, their parents were asked to fill in one self-constructed question about their expectations regarding future work of the young adult with intellectual and/or developmental disability. Face and content validity of these questions seem to be sufficient because these were developed after study of the relevant literature, feedback from teachers from special needs education and feedback from professionals of the Dutch Social Security Institute.

Measures

Work Outcome

The cohort was linked to POLIS register data. The POLIS registry is a database, in which all Dutch workers are included that have earned any wage (from regular, supported or sheltered jobs) in the period concerned. This linkage was done quarterly, for a total of twelve different periods, from December 2008 until September 2011. Using these data, we constructed a work outcome measure for ‘entering competitive employment during 18 months of follow-up’. Only wage earning—for any number of hours—following disability assessment was taken into account. The follow-up period differed for the individuals in the study and started in the quarter following the disability assessment at the SSI. The maximum follow-up period was 2 years and 9 months, the minimum follow-up period was 18 months.

Expectations at Baseline, When Young Adults were Still Attending Special Education

Expectation of young adult regarding future work was measured with one self-constructed question “Do you think you are able to work in competitive employment?” with response options yes, completely/yes, partly/no. From these responses a dichotomous variable was derived that contrasted ability (yes completely and yes partly) with no ability.

Expectation of parents regarding future work for young adult was based on the parent’s response to the self-constructed question “In your opinion, what ability does your

child have to participate in work?” Response options were regular work/supported employment/sheltered employment/day centre or voluntary work/no ability to work.

Expectation of school teacher regarding future work for young adult was based on the school teacher’s response to the self-constructed question “In your opinion, what ability does your student have to participate in work?” Response options were regular work/supported employment/sheltered employment/day centre or voluntary work/no ability to work.

The responses of parents and teachers were subsequently dichotomized into: (1) young adult is able to participate in competitive employment (regular work/supported employment), and (2) young adult is not able to participate in competitive employment (no ability to work/sheltered employment/day centre or voluntary work).

Demographics

Demographics (*age and gender*) of the young adults were derived from SSI registers. Data regarding *primary diagnosis* and comorbidity was derived from the register forms filled in by the Insurance Physicians of the SSI at baseline.

Education was based on the respondent’s report at baseline on the question “Which education have you followed after primary school”. Response options were Special Secondary Education/Practical Education/Secondary education/Vocational training/High school/Higher Education. The highest educational level mentioned was included. In this study only respondents from special secondary education and practical education, both special needs education, were included.

Living situation was based on the respondent’s report at baseline on two questions: (1) “What is your living situation?” with response options Parental home/Own place/Student home/Sheltered home/Institution or Hospital/Other and; (2) “Who is living there with you?”. Subsequently four mutually exclusive groups were constructed: (1) living independently with or without partner; (2) living with parents/family/foster family; (3) living in a supported/sheltered home; and (4) other living situations [51].

Statistical Analyses

Accuracy of the predictive value of the expectations of the participants, parents and school teachers was assessed by calculating the sensitivity, specificity and positive predictive value (PPV). 95 % confidence intervals (CIs) based on normal distributions were calculated for each PPV estimate.

The accuracy of the predictive value was also evaluated by calculating the area under the receiver operating characteristic curve (AUC). The AUC is a measure of the

diagnostic power of a test that summarizes the likelihood of a dichotomized outcome (entering competitive employment) at various cut-offs of a test, in this case an expectation. The area under this curve (AUC) represents the overall accuracy of a test, with a value approaching 1.0 indicating a higher sensitivity and specificity. The AUC usually ranges from 0.50 (no discrimination) to 1.0 (perfect discrimination) [52]. Next, the perspective (either young adult, parent or teacher) with the highest AUC was entered into a logistic regression analysis with actual work during follow-up as outcome and the perspective with the second highest AUC was added. From this model, the predicted probabilities were calculated, which were then used to calculate the AUC of this combined model. Subsequently also the last perspective was added to the logistic model and the AUC was calculated again. Finally, age and gender were also added to the logistic model as independent variables, to assess odds ratio's and 95 % CIs for each of the perspectives adjusted for age and gender and to see which perspective was most predictive. All analyses were performed in IBM SPSS Statistics 20 (Armonk, NY, 2010).

Results

Description of the Sample

Administrative data about gender and age was available for all participants ($n = 381$). Of the participants, 40 (10.5 %) were not included in the analysis, because they already worked at baseline and thus were not *at risk to enter* into competitive employment. Of the remaining participants ($n = 341$), 97.1 % filled in a questionnaire ($n = 331$). A parent-questionnaire was completed for 92.4 % of the participants ($n = 315$). The school teacher filled in a questionnaire for 65.2 % of the participants ($n = 222$). There were data from all three perspectives for 152 (44.6 %) of the participants. Participants with incomplete data did not statistically significantly differ from complete cases with regard to gender, age and diagnosis. The only significant difference was found in work outcome ($p = .049$): participants with complete data found work more often than respondents with incomplete data.

The total sample consisted of 225 men (66.0 %) and 116 women (34.0 %), with a mean age of 17.8 years (SD 0.5) (see Table 1). Most participants had an intellectual disability (83.3 %) and 27.1 % of them had a comorbid developmental disorder. Of the participants with a developmental disorder (16.7 %), 33.3 % had a comorbid intellectual disorder. Of the participants, 36.4 % ($n = 124$) entered competitive employment in the 18 months following claim assessment. Of them 42.7 % worked fulltime, 37.1 % worked part-time (12–32 h a week) and 20.2 %

worked less than 12 h a week. Most of the working respondents worked in retail (21.8 %), for temporary job agencies (18.5 %), in agriculture/food industry (13.7 %), and health care (11.3 %). The majority of respondents were granted a disability benefit (96.4 %) and 3.6 % were denied a benefit. The majority of the participants came from schools for practical training (58.1 %) and most lived with parents or family (87.0 %). Of the young adults, 56.0 % expected to be able to work in competitive employment. Of the parents also 56.0 % and of the school teachers 39.9 % expected the young adult to be able to work competitively.

Accuracy of Expectations Concerning Entering into Competitive Employment by Young Adults, Parents and School Teachers

The analyses regarding the accuracy of the predictive value of the expectations were performed on complete cases. The sensitivities of expectations (the percentage of young adults that were correctly identified as able to work in competitive employment) by the young adult with an intellectual and/or developmental disability, their parents and school teachers varied between 0.88 and 0.92 and the specificities (the percentage of young adults that were correctly identified as unable to work in competitive employment) between 0.35 and 0.44 (see Table 2). The positive predictive values varied between 0.50 and 0.53.

The area under the curve for the school teachers' perspective was the highest at 0.66 (95 % CI 0.57–0.75) (see Table 2). When the perspective of the parent was added, the area under the curve increased to 0.69 (95 % CI 0.61–0.77) and when the young adults' perspective was added to the model with parents and school teachers the area under the curve increased to 0.70 (95 % CI 0.62–0.79).

The results of the logistic regression analyses are presented in Table 3. The results indicate that the school teachers' expectation of ability to work in competitive employment was the only perspective statistically significantly related to entering competitive employment during 18 months of follow-up. When school teachers expected their student to be able to work in competitive employment, the respondents had a nearly three times higher odds to enter competitive employment during follow-up compared to respondents with school teachers expecting that their student would not be able to work in competitive employment (OR 2.87, 95 % CI 1.06–7.77).

The same OR was observed for parents, but because of the slightly higher standard error, this relation did not reach statistical significance ($p = .068$).

Table 1 Characteristics of young adults with intellectual and/or developmental disabilities from a special needs education background

	Total N (%)	No work N (%)	Work at any time N (%)
Work outcome	341 (100 %)	217 (63.6 %)	124 (36.4 %)
Gender (data SSI)			
Male	225 (66.0 %)	137 (63.1 %)	88 (71.0 %)
Female	116 (34.0 %)	80 (36.9 %)	36 (29.0 %)
Age (data SSI)			
17 years	81 (23.8 %)	56 (25.8 %)	25 (20.2 %)
18 years	252 (73.9 %)	155 (71.4 %)	97 (78.2 %)
19–20 years	8 (2.4 %)	6 (2.8 %)	2 (1.6 %)
Primary diagnosis			
Intellectual disability	284 (83.3 %)	178 (82.0 %)	106 (85.5 %)
Developmental disorders	57 (16.7 %)	39 (18.0 %)	18 (14.5 %)
Education ^a			
Special secondary education	143 (41.9 %)	112 (51.6 %)	31 (25.0 %)
Schools for practical training	198 (58.1 %)	105 (48.4 %)	93 (75.0 %)
Living arrangements ^a (n = 339)			
Living independently (with or without partner)	5 (1.5 %)	3 (1.4 %)	2 (1.6 %)
Living with parents/family/foster family	295 (87.0 %)	180 (83.3 %)	115 (93.5 %)
Residential placement/sheltered accommodation	38 (11.2 %)	32 (14.8 %)	6 (4.9 %)
Other living situation	1 (0.3 %)	1 (0.5 %)	0 (0.0 %)
Expectation young adult with disability ^a			
Completely able to work in competitive employment	78 (22.9 %)	31 (14.3 %)	47 (37.9 %)
Partly able to work in competitive employment	113 (33.1 %)	72 (33.2 %)	41 (33.1 %)
Not able to work in competitive employment	103 (30.2 %)	86 (39.6 %)	17 (13.7 %)
Unknown	47 (13.8 %)	28 (12.9 %)	19 (15.3 %)
Expectation parent regarding ability to work			
Regular work	17 (5.0 %)	10 (4.6 %)	7 (5.6 %)
Supported employment	174 (51.0 %)	89 (41.0 %)	85 (68.5 %)
Sheltered employment	50 (14.7 %)	43 (19.8 %)	7 (5.6 %)
Day centre or voluntary work	34 (10.0 %)	33 (15.2 %)	1 (0.8 %)
No ability to work	4 (1.2 %)	3 (1.4 %)	1 (0.8 %)
Unknown	62 (18.2 %)	39 (18.0 %)	23 (18.5 %)
Expectation school teacher regarding ability to work			
Regular work	13 (3.8 %)	3 (1.4 %)	10 (8.1 %)
Supported employment	123 (36.1 %)	59 (27.2 %)	64 (51.6 %)
Sheltered employment	40 (11.7 %)	30 (13.8 %)	10 (8.1 %)
Day centre or voluntary work	22 (6.5 %)	22 (10.1 %)	0 (0.0 %)
No ability to work	0 (0.0 %)	0 (0.0 %)	0 (0.0 %)
Unknown	143 (41.9 %)	103 (47.5 %)	40 (32.3 %)

SSI Dutch Social Security Institute

^a Self-report by young adult

Discussion

This study shows that young adults with intellectual and/or developmental disabilities from special needs education, their parents and their school teachers are moderately able to predict future work when asked about their expectations regarding the ability of the young adult to work in

competitive employment. The expectation of the school teacher was the only perspective that significantly predicted entering competitive employment, with a complementary effect of the expectation of parents and a small additional effect of the expectation of the young adult.

In our study we included young adults with intellectual as well as developmental disabilities or a combination of

Table 2 Accuracy of predictive value of expectations regarding entering competitive employment of young adult, their parent and school teacher

Predictive value of expectations ^a n = 152	Entering competitive employment	Sensitivity	Specificity	AUC	95 % CI	PPV	95 % CI
Young adult	57 (37.5 %)	0.89	0.35	0.62	0.53–0.71	0.50	0.45–0.55
Parent	59 (38.8 %)	0.92	0.39	0.65	0.57–0.74	0.52	0.47–0.57
School teacher	56 (36.8 %)	0.88	0.44	0.66	0.57–0.75	0.53	0.48–0.58

^a Only complete cases were included in the analysis

Table 3 Logistic regression analysis of predictors of entering competitive employment during 18 months follow-up

(n = 152)	OR ^a	95 % CI		p
		Lower	Upper	
Age	1.002	.449	2.240	.995
Gender	2.152	1.012	4.576	.046
Expectation of young adult	1.772	.611	5.140	.292
Expectation of parents	3.182	.920	11.007	.068
Expectation of school teachers	2.865	1.056	7.773	.039

^a Odd's ratio = quantification of how strongly the variable is associated with entering competitive employment during the 18 months follow-up, independently from the associations of the other independent variables in this model

both, as these disabilities regularly co-occur. Most studies in the literature include only one of these diagnoses [3, 13, 14, 17–21, 53]. However, the limitations experienced by both groups and the work related outcomes for both groups are similar.

Of the included students 36 % entered competitive employment. This rather low percentage of young adults from special needs education entering competitive employment has been found in other studies as well [3, 9]. On the one side, this may be an effect of the legislation, the vocational programs that are available to this population, the availability of jobs and the readiness of the employers to integrate this population into the work force. During our longitudinal study the unemployment rate of young adults in general (15–25 years) in the Netherlands increased from 9.3 % in 2008 to 15.0 % in 2013 [54]. For vulnerable young adults, like those with disabilities, unemployment rates exceed those of their peers without disabilities. In our region in recent years there has been a limited number of jobs available for starters on the labor market. Young adults with limited abilities may therefore have more difficulty to enter competitive employment. However, the low percentage of young adults entering competitive employment may also reflect the limited abilities of these young adults.

We found a complementary effect of the expectation of parents to the expectation of teachers. Parents had a lower percentage of false negative expectations, or higher

sensitivity (expecting their child not to enter into competitive employment, when these persons did enter into competitive employment) whereas teachers had a lower percentage of false positive expectations or higher specificity (expecting their student to enter into competitive employment when in reality they did not). Literature suggests that parents can be a powerful influence on the employment options, experiences and outcomes of their young adults [2, 3, 10, 29, 37]. Parents may stimulate their child to achieve a sense of fulfilment by using their talents and abilities to the full [29] including finding suitable employment. In spite of the low educational level of the majority of the parents (54.5 %), parents seem to be moderately able to estimate their child's future work outcome.

The perspective of young adults was the least predictive. One reason for the somewhat lower discriminative value of the expectation of the young adult may be that the majority of our participants had an intellectual disability. It is hard for these young adults to adequately assess their own abilities. Our results, supported by other studies, show that co-operation between school teachers and parents appears to result in valuable information in the process to develop a realistic view of an young adult's skills [2, 39, 40].

Explanations for the limited predictive value of expectations in this study can be found on different levels. Expectations as well as work outcome may be influenced by other factors, that were not included in this study. Economic circumstances and labor market situation may restrain young adults in their success to enter competitive employment. While teachers and parents may be able to adequately assess the ability of the young adult to work, lack of jobs may prevent young adults from entering employment. The type of school that the young adult attended before entering the labor market may also influence the work outcome. In our study respondents from Practical Education had a higher odds to find work than respondents from Special Secondary Education schools (OR 2.63, 95 % CI 1.18–5.86). In general schools for Practical Education are more intentional about preparing the young adult for the labor market.

Furthermore, the adequacy of the preparation of the young adult in the transition from school to work may also

influence the work outcome. The young adult may have an ability to work in competitive employment, but when he/she lacks the necessary skills to apply for a job or the skills taught do not match the demand in the labor market, it may be difficult for this young adult to find a job.

In the final years at school preparations should start for a smooth transition from school to work, including practical job training and job orientation [40–42]. As mentioned before, special needs schools in the Netherlands provide vocational training and internships for young adults with disabilities in the final years at school and appropriate job placements in the transition from school to work. Of the young adults 65.4 % was satisfied with this preparation for the labour market by their school. As parents may have insight in the abilities as well as affinities of their young adult, their input is valuable for teachers in planning for the transition, e.g. which job placements would be suitable and which kind of support the young adult needs to be able to function well [2, 3]. A review of transition programs for young people with disabilities found that schools should support their teachers in involving both students and their parents in these decision-making processes to achieve the desired employment outcome [40–42]. If teachers and parents work together with the student to prepare for the labour market, they may also influence the expectations of the young adult to become more realistic and achievable.

Strengths and Limitations of the Study

The strengths of this study are the longitudinal design and the use of register data for work outcome, measured quarterly, allowing accurate assessment of work outcome during the follow-up for the complete sample.

The limited availability of the expectations of teachers and missings in the expectations of young adults and parents, resulted in inclusion of only 45 % of the respondents in the analyses. Non-response analysis showed no statistically significant differences between the respondents with complete and incomplete data with regard to gender, age and diagnosis. However, more respondents with complete data found work during the follow-up than respondents with incomplete data. As we know many school teachers were reluctant to fill in a question regarding future work outcome for a respondent involved, when they did not think employment was a realistic option for this student, our results are mainly applicable to young adults from special needs education with the potential to be engaged in work according to the teacher. In addition, we cannot rule out the possibility that there might have been differences in the characteristics of parents and school teachers of responders and non-responders. The results might be biased because more concerned and involved parents and school teachers filled out a questionnaire. However, it is unknown whether

the expectations of these parents and teachers are more accurate than those from less concerned parents and teachers or not. The missing values will have caused less precise estimates of the parameters of interest.

The majority of the participants as well as the parents may have had a limited reading level. However, the participants were allowed to ask for help. If the parents were not able to help, they would have been able to ask the school teacher or other supervisor for help. Of the respondents in this study we know 61.2 % asked for help filling in the questions, 27.6 % completed the questions without help and 8.1 % of the respondents had the questions filled in completely by another person. Therefore we expect that the effect of this limitation on our results is limited.

As the young adults with intellectual and/or developmental disabilities included in this study were all applying for a disability benefit, they may not be representative for the population with intellectual and/or developmental disabilities in special needs education. However, the majority of young adults with intellectual and/or developmental disabilities in the Netherlands are educated in special needs education. Moreover, the majority of these young adults apply for a disability benefit, so no large differences between this population from special needs education and our sample are expected.

At baseline most of the respondents were still at school. It is unknown whether the young adults left school within the 18 months of follow-up. However, in the Dutch special needs educational system most young adults leave school at 18 years of age. As the majority of respondents was 18 years or older at baseline, we expect that most of them will have left school during the follow-up and were able to enter competitive employment.

Conclusion and Recommendations

Expectations of school teachers and parents seem to be valuable in predicting future work outcome of young adults with intellectual and/or developmental disabilities from special needs education, even more so when these two perspectives are combined.

In the Dutch system the majority of students with intellectual and developmental disabilities are educated in special needs education classes. In the transition from school to work, they receive special assistance to develop vocational skills and to find a job, if the severity of their disability allows work. Co-operation of school teachers and parents in setting realistic expectations for the young adult is useful in ensuring the best possible employment outcomes for the young adult. Therefore, it is important for professionals working with the young adult in the transition from school to work to incorporate the knowledge of school teachers and parents regarding the abilities of the

young adult to enter competitive employment as a valuable source of information. Other factors influencing work outcome of young adults with intellectual and/or developmental disabilities, e.g. socio-economic status, type of school, and vocational programs provided, have not been included in this study, but should be explored in future research. Partnerships between employers, employment agencies and educational institutions, incorporating the young adult and his or her parents, can contribute to accomplish the best possible work outcome for the young adult.

Conflict of interest Author Holwerda, author Brouwer, author De Boer, author Groothoff and author Van der Klink declare that they have no conflict of interest.

Ethical standards All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study'.

References

1. Geenen SJ, Powers LE, Sells W. Understanding the role of health care providers during the transition of adolescents with disabilities and special health care needs. *J Adolesc Health*. 2003;32(3):225–33.
2. Eisenman LT. Theories in practice: school-to-work transitions-for-youth with mild disabilities. *Exceptionality*. 2003;11(2):89–102.
3. Wagner M, Newman L, Cameto R, Garza N, Levine P. After High School: A First Look at the Postschool Experiences of Youth with Disabilities. A Report from the National Longitudinal Transition Study-2 (NLTS2). 2005 04/01.
4. Lindstrom L, Doren B, Miesch J. Waging a living: career development and long-term employment outcomes for young adults with disabilities. *Except Child*. 2011;77(4):423–34.
5. Garcia-Iriarte E, Balcazar F, Taylor-Ritzler T. Analysis of case managers' support of youth with disabilities transitioning from school to work. *J Vocat Rehabil*. 2007;26(3):129–40.
6. Wagner MM, Blackorby J. Transition from high school to work or college: how special education students fare. *Future Child*. 1996;6(1):103–20.
7. Lindsay S. Employment status and work characteristics among adolescents with disabilities. *Disabil Rehabil*. 2011;33(10):843–54.
8. Statistics Netherlands. Secondary Vocational Education compl-eters on the labour market; characteristics of work, 2007-2008 and 2008-2009 (in Dutch: MBO-ge-diplomeerden op de arbeids-markt; kenmerken van werk, 2007-2008 en 2008-2009). 2012. <http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=81626NED&LA=NL>. Accessed 16 Oct 2012.
9. Fabian ES. Urban youth with disabilities: factors affecting transition employment. *Rehabil Couns Bull*. 2007;50(3):130–8.
10. Test DW, Mazzotti VL, Mustian AL, Fowler CH, Kortering L, Kohler P. Evidence-based secondary transition predictors for improving postschool outcomes for students with disabilities. *Career Dev Transit Except Individ*. 2009;32(3):160–81.
11. Newman L, Wagner M, Cameto R, Knokey A, National Center for Special Education Research. The Post-High School Outcomes of Youth With Disabilities up to 4 Years After High School: A Report From the National Longitudinal Transition Study-2 (NLTS2). NCSE 2009-3017. National Center for Special Education Research 2009 04/01.
12. Newman L, Wagner M, Knokey A, Marder C, Nagle K, Shaver D, et al. The Post-High School Outcomes of Young Adults with Disabilities up to 8 Years after High School: A Report from the National Longitudinal Transition Study-2 (NLTS2). NCSE 2011-3005. National Center for Special Education Research 2011 09/01.
13. Lysaght R, Ouellette-Kuntz H, Lin CJ. Untapped potential: perspectives on the employment of people with intellectual disability. *Work*. 2012;41(4):409–22.
14. Rose J, Saunders K, Hensel E, Kroese BS. Factors affecting the likelihood that people with intellectual disabilities will gain employment. *J Intellect Disabil*. 2005;9(1):9–23.
15. WHO, World Bank. World report on disability. Geneva: World Health Organisation; 2011.
16. Ireys HT, Salkever DS, Kolodner KB, Bijur PE. Schooling, employment, and idleness in young adults with serious physical health conditions: effects of age, disability status, and parental education. *J Adolesc Health*. 1996;19(1):25–33.
17. Engstrom I, Ekstrom L, Emilsson B. Psychosocial functioning in a group of Swedish adults with Asperger syndrome or high-functioning autism. *Autism*. 2003;7(1):99–110.
18. Billstedt E, Gillberg C, Gillberg C. Autism after adolescence: population-based 13- to 22-year follow-up study of 120 individuals with autism diagnosed in childhood. *J Autism Dev Disord*. 2005;35(3):351–60.
19. Shattuck PT, Narendorf SC, Cooper B, Sterzing PR, Wagner M, Taylor JL. Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*. 2012;129(6):1042–9.
20. Gjervan B, Torgersen T, Nordahl HM, Rasmussen K. Functional impairment and occupational outcome in adults with ADHD. *J Atten Disord*. 2012;16(7):544–52.
21. Halmoy A, Fasmer OB, Gillberg C, Haavik J. Occupational outcome in adult ADHD: impact of symptom profile, comorbid psychiatric problems, and treatment: a cross-sectional study of 414 clinically diagnosed adult ADHD patients. *J Atten Disord*. 2009;13(2):175–87.
22. Laisne F, Lecomte C, Corbiere M. Biopsychosocial predictors of prognosis in musculoskeletal disorders: a systematic review of the literature. *Disabil Rehabil*. 2012;34(5):355–82.
23. Iles RA, Davidson M, Taylor NF. Psychosocial predictors of failure to return to work in non-chronic non-specific low back pain: a systematic review. *Occup Environ Med*. 2008;65(8):507–17.
24. Cornelius LR, van der Klink JJ, Groothoff JW, Brouwer S. Prognostic factors of long term disability due to mental disorders: a systematic review. *J Occup Rehabil*. 2011;21(2):259–74.
25. Tiedtke C, de Rijk A, Dierckx de Casterle B, Christiaens MR, Donceel P. Experiences and concerns about 'returning to work' for women breast cancer survivors: a literature review. *Psycho-oncology*. 2010;19(7):677–83.
26. Dekkers-Sanchez PM, Hoving JL, Sluiter JK, Frings-Dresen MH. Factors associated with long-term sick leave in sick-listed employees: a systematic review. *Occup Environ Med*. 2008;65(3):153–7.
27. Nieuwenhuijsen K, Cornelius LR, de Boer MR, Groothoff JW, Frings-Dresen M, van der Klink JJJ, et al. Predicting improvement of functioning in disability claimants. *J Occup Rehabil*. 2013. doi:10.1007/s10926-013-9469-2.
28. Betz CL, Redcay G. An exploratory study of future plans and extracurricular activities of transition-age youth and young adults. *Issues Compr Pediatr Nurs*. 2005;28(1):33–61.

29. Cooney BF. Exploring perspectives on transition of youth with disabilities: voices of young adults, parents, and professionals. *Ment Retard*. 2002;40(6):425.
30. Cameto R, Levine P, Wagner M, Office of Special Education and Rehabilitative Services, SRI International, Menlo Park, CA. Transition planning for students with disabilities: a special topic report of findings from the National Longitudinal Transition Study-2 (NLTS2). National Center for Special Education Research 2004 11/01.
31. Wagner M, Newman L, Cameto R, Levine P, Marder C, Institute of ES. Perceptions and expectations of youth with disabilities. A Special Topic Report of Findings from the National Longitudinal Transition Study-2 (NLTS2). NCSE 2007–2006. National Center for Special Education Research 2007 08/01.
32. Hughes C. Transition to adulthood: supporting young adults to access social, employment, and civic pursuits. *Ment Retard Dev Disabil Res Rev*. 2001;7(2):84–90.
33. Carroll A, Houghton S, Wood R, Unsworth K, Hattie J, Gordon L, et al. Self-efficacy and academic achievement in Australian high school students: the mediating effects of academic aspirations and delinquency. *J Adolesc*. 2009;32(4):797–817.
34. Carroll C, Dockrell J. Enablers and challenges of post-16 education and employment outcomes: the perspectives of young adults with a history of SLI. *Int J Lang Commun Disord*. 2012;47(5):567–77.
35. Eisenman LT. Social networks and careers of young adults with intellectual disabilities. *Intellect Dev Disabil*. 2007;45(3):199–208.
36. Lindstrom L, Doren B, Metheny J, Johnson P, Zane C. Transition to employment: role of the family in career development. *Except Child*. 2007;73(3):348–66.
37. Doren B, Gau JM, Lindstrom LE. The relationship between parent expectations and postschool outcomes of adolescents with disabilities. *Except Child*. 2012;79(1):7–23.
38. King GA, Baldwin PJ, Currie M, Evans J. Planning successful transitions from school to adult roles for youth with disabilities. *Child Health Care*. 2005;34(3):193–216.
39. European Agency for Development in Special Needs Education. Special Needs Education in Europe (Volume 2); Provision In Post-Primary Education. 2006. ISBN: 87-91500-00-1.
40. Laragy C. Self-determination within Australian school transition programmes for students with a disability. *Disabil Soc* 200; 19(5):519–530.
41. Kim R, Dymond SK. Special education teachers' perceptions of benefits, barriers, and components of community-based vocational instruction. *Intellect Dev Disabil*. 2010;48(5):313–29.
42. Oeseburg B, Jansen DEMC, Reijneveld SA, Dijkstra GJ, Groot-hoff JW. Limited concordance between teachers, parents and healthcare professionals on the presence of chronic diseases in ID-adolescents. *Res Dev Disabil*. 2010;31(6):1645–51.
43. Fall AM, Roberts G. High school dropouts: interactions between social context, self-perceptions, school engagement, and student dropout. *J Adolesc*. 2012;35(4):787–98.
44. Mercer SH, Nellis LM, Martinez RS, Kirk M. Supporting the students most in need: academic self-efficacy and perceived teacher support in relation to within-year academic growth. *J Sch Psychol*. 2011;49(3):323–38.
45. Chen JJ. Relation of academic support from parents, teachers, and peers to Hong Kong adolescents' academic achievement: the mediating role of academic engagement. *Genet Soc Gen Psychol Monogr*. 2005;131(2):77–127.
46. Sanders CE, Field TM, Diego MA. Adolescents' academic expectations and achievement. *Adolescence*. 2001;36(144):795–802.
47. Johnson W, McGue M, Iacono WG. Genetic and environmental influences on academic achievement trajectories during adolescence. *Dev Psychol*. 2006;42(3):514–32.
48. Sanford C, Newman L, Wagner M, Cameto R, Knokey A, Shaver D, et al. The post-high school outcomes of young adults with disabilities up to 6 years after high school: key findings from the National Longitudinal Transition Study-2 (NLTS2). NCSE 2011–2004. National Center for Special Education Research 2011 09/01.
49. Wagner M, Newman L, Cameto R, Levine P. Changes over time in the early postschool outcomes of youth with disabilities. A Report of Findings from the National Longitudinal Transition Study (NLTS) and the National Longitudinal Transition Study-2 (NLTS2). 2005 06/01.
50. Holwerda A, Groothoff JW, de Boer MR, van der Klink JJ, Brouwer S. Work-ability assessment in young adults with disabilities applying for disability benefits. *Disabil Rehabil*. 2013;35(6):498–505.
51. RIVM (National Institute for Public Health and the Environment/ Rijksinstituut voor Volksgezondheid en Milieu). National Monitor Youth Health in the Netherlands (in Dutch: Nationale monitor jeugdgezondheid). 2005. <https://www.monitorgezondheid.nl/jeugdindicatoren.aspx>. Accessed 11 Jul 2012.
52. Katz D, Foxman B. How well do prediction equations predict? Using receiver operating characteristic curves and accuracy curves to compare validity and generalizability. *Epidemiology*. 1993;4(4):319–26.
53. Taylor JL, Seltzer MM. Employment and post-secondary educational activities for young adults with autism spectrum disorders during the transition to adulthood. *J Autism Dev Disord*. 2011;41:566–74.
54. Statistics Netherlands. Large increase of unemployment (in Dutch: Sterke stijging werkloosheid). 2013. <http://www.cbs.nl/NR/rdonlyres/F3122686-54F7-46F9-80A0-40063E2AF677/0/pb13n013.pdf> Accessed 19 Jun 2013.